

**Before the
Federal Communications Commission
Washington, D.C. 20554**

RECEIVED

MAY 28 1996

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
Amendment of Parts 2, 15, and 97 of the)
Commission's Rules to Permit Use of Radio)
Frequencies Above 40 GHz)
for New Radio Applications)

ET Docket No. 94-124
RM-8308

DOCKET FILE COPY ORIGINAL

COMMENTS OF CUTLER-HAMMER, INC.

Cutler-Hammer, Inc. ("Cutler-Hammer"), by its attorneys, hereby submits its comments on the *Second Notice of Proposed Rulemaking* in the above-captioned proceeding, FCC 95-499, released Dec. 15, 1995, 61 *Fed. Reg.* 14041 (Mar. 29, 1996) ("*Notice*"). Cutler-Hammer urges the Commission to ensure that any spectrum etiquette rules adopted for the 59-64 GHz band do not unnecessarily limit the use of that band.

BACKGROUND

Cutler-Hammer manufactures sensor equipment for use in automated production applications. Such sensors play a number of critical roles, including enhancing operator safety, performing quality control, optimizing production yields and improving productivity. In its efforts to respond to industry demand for smaller, more accurate and more reliable sensors, Cutler-Hammer has focused on the 59-64 GHz band adopted by the Commission for unlicensed uses. This band is consistent with the requirements of advanced sensor design because the high

No. of Copies rec'd
List ABCDE

025

frequency will permit compact size, the wide bandwidth will permit accurate data measurements within a close range, and the allocation of the band for unlicensed devices will permit high volume production.

As a result, Cutler-Hammer has a strong interest in ensuring that the rules governing equipment in the 59-64 GHz band are compatible with sensor operation.¹ The *Notice* seeks comment on the development of a spectrum etiquette for the band. Specifically, it requests input on whether a spectrum etiquette is necessary, and if so, what specific standards should be adopted to ensure efficient use of the band. *Notice* at ¶ 64. In addition, the *Notice* recognizes that even if a spectrum etiquette is developed for certain types of devices, it may be desirable to permit operation of other equipment under different parameters if there is a low probability of interference. *Id.* The Commission states that it will allow industry participants a year to develop spectrum etiquette standards. If those efforts are unsuccessful or if the record does not demonstrate a need for spectrum etiquette, however, the Commission indicates that it intends to permit operation in the 59-64 GHz band without a spectrum etiquette. *Id.*

Cutler-Hammer does not object to the development of spectrum etiquette standards for the 59-64 GHz band, provided that those standards do not

¹ For that reason, Cutler-Hammer has sought limited reconsideration of the Commission's *First Report and Order* in this proceeding. Specifically, we have requested that the Commission modify Section 15.255, 47 C.F.R. § 15.255, to permit operation of fixed field disturbance sensors in the 59-64 GHz band. We have also requested that the Commission ensure that development of spectrum etiquette does not unduly delay the implementation of the 59-64 GHz band. See *Petition for Reconsideration of Cutler-Hammer, Inc.*, ET Docket No. 94-124 (filed May 2, 1996).

unnecessarily restrict the technologies that can be used in the band. We understand that parties intending to design broadband data communications systems for operation in this spectrum believe that technical parameters need to be devised in order to promote interoperability of equipment and reduce the likelihood of interference. However, as the *Notice* recognizes, spectrum etiquette standards tailored to that type of technology will not necessarily be appropriate for other possible applications within the band.

The challenge faced by the industry is to develop spectrum etiquette rules that accommodate a broad range of possible applications. Cutler-Hammer plans to participate fully in this process. We are optimistic that a solution can be worked out within the prescribed time period that meets the needs of broadband communications devices without foreclosing the operation of other types of equipment including sensors.

The Commission, however, must be prepared to take action if the etiquette negotiations do not result in a proposal that is consistent with encouraging the development of innovative applications in this band. If the industry is unable to agree on any proposal, the Commission should follow through with its stated intention to permit use of the band without spectrum etiquette standards. On the other hand, the industry negotiations may produce a proposal that interferes with potential uses of the band and is not acceptable to all participants. In that event, the Commission should modify or reject the proposal to

ensure that spectrum etiquette does not become a barrier to robust use of the 59-64 GHz band.

I. ANY SPECTRUM ETIQUETTE RULES ADOPTED MUST PERMIT MULTIPLE USES OF THE 59-64 GHz BAND

In the *Notice*, the Commission stated that it generally has not required spectrum etiquettes for unlicensed transmitters out of concern that such rules “could restrict the development of new technology.” *Notice* at ¶ 64. Cutler-Hammer agrees that spectrum etiquette rules should be adopted only if they will not interfere with the introduction of a broad range of applications within the 59-64 GHz band. The Commission cannot permit parameters developed for a particular type of service to act as an obstacle to the development of other uses of the band.

Sensors such as those being designed by Cutler-Hammer are unlikely to be susceptible to interference from or cause interference to other equipment operating in the 59-64 GHz band. As a result, application of spectrum etiquette rules to sensors is unnecessary to protect other uses of the band. Cutler-Hammer will participate with other industry members in spectrum etiquette discussions in the expectation that the resulting proposal for etiquette rules will recognize an exemption for devices such as our sensors that do not pose a threat to other applications. If such a proposal cannot be developed, however, the Commission must be prepared to step in to ensure that implementation of the rules for the 59-64

GHz band is not unduly delayed and that applicable policies protect all prospective uses of the band.

A. A “One Size Fits All” Approach Is Not Appropriate for Spectrum Etiquette in the 59-64 GHz Band

As an initial matter, Cutler-Hammer strongly agrees with the recognition in the *Notice* that spectrum etiquette rules developed with a particular type of equipment in mind will not necessarily be acceptable for other types of devices. *Notice* at ¶ 64. If the Commission’s objective of ensuring that the introduction of new technologies in the 59-64 GHz band is to be achieved, any spectrum etiquette rules must be flexible enough to accommodate a wide range of applications.²

For example, we understand that one element of the spectrum etiquette contemplated by some parties interested in broadband data applications is a “listen before talk” function. This would require equipment to monitor the band before beginning to transmit to determine whether another transmission was already in progress. Such a requirement might be useful to preventing interference within a data communication system. However, application of such a rule to sensor

² In this respect, the 59-64 GHz band presents a very different situation than the Commission faced when it decided to adopt uniform spectrum etiquette rules for unlicensed Personal Communications Services (“PCS”) devices. There, the Commission was simply concerned with ensuring that PCS equipment was designed to accommodate both voice and data operations. *See Amendment of the Commission’s Rules to Establish New Personal Communications Services*, 8 FCC Rcd 7700, 7775-78 (1993). Here, in contrast, the Commission has not specified any particular use of the 59-64 GHz band, and must ensure that spectrum etiquette rules are consistent with a much broader variety of potential uses of the band.

operations would be disastrous, because many sensor installations require continuous, real-time operation.

Similarly, spectrum etiquette rules that are designed to facilitate broadband data communications may not be compatible with other types of applications in the 59-64 GHz band that may be developed in the future. Accordingly, any spectrum etiquette standards that are applied to the band must have sufficient flexibility built in to permit introduction of new services that do not pose a threat of interference to other operations.

In other words, the Commission must ensure that any spectrum etiquette rules adopted are narrowly tailored to address situations where there is a real threat of interference or other need for standards to ensure interoperability of equipment. The Commission must not permit overly broad spectrum etiquette requirements to unnecessarily limit the uses of the 59-64 GHz band.

B. Spectrum Etiquette Rules Are Not Needed to Prevent Interference With Respect to Sensor Operations

In particular, the technical characteristics of the sensors being designed by Cutler-Hammer for operation in the 59-64 GHz band make the risk of interference to other uses of the band minimal. As a result, subjecting sensors to spectrum etiquette rules is not necessary to protect other applications.

The sensors Cutler-Hammer is developing are intended for use at close range, and as a result, can operate at a very low transmission power. Specifically, Cutler-Hammer expects that sensor applications typically will require a sense

range of less than two feet. The sensors will operate at a power density of no more than 200 nW/cm² at a distance of 3 meters. This represents a small fraction of the maximum power level of 9μW/cm² at 3 meters that is permitted for operations in the 59-64 GHz band. See 47 C.F.R. § 15.255 (b). The sensors will use a directional antenna with a half-power beam angle of less than 65 degrees.

The sensors are also designed for use in an environment where it is unlikely that the kind of broadband data equipment being proposed for the 59-64 GHz band would be operating. The sensors are needed for fixed installation in automated manufacturing equipment on the factory floor. This environment is characterized by the presence of dust, extreme temperatures, caustic chemicals, and electrical noise from motors and solenoids. As a result, it is not a setting that would be suitable for operation of sophisticated wideband data communications devices, or in which such communications would normally be required.

The potential for interference from sensor operations to data links would be remote in any event. Point-to-point data communications devices could operate on the factory floor only if they were installed high above the production equipment to avoid obstacles and get a clear line-of-sight. Sensors, in contrast, will be mounted within the production equipment, resulting in several signal reflections before any wave propagation would exit the machine. Thus, given the low operational power of the sensors and the signal attenuation characteristics of the oxygen absorption band, any sensor emissions outside the machinery would be very weak. As a result, it is highly improbable that such emissions would be strong

enough to interfere with data communications operations, even in the unlikely event that such operations were occurring in the vicinity of sensor use.

It is similarly unlikely that sensor transmissions would experience harmful interference from data communications. As the *Notice* recognizes, such communications would normally use directional antennas with narrow beamwidths. *Notice* at n.72. Furthermore, as discussed above, data devices would have to be installed above the level of production equipment to operate successfully on a factory floor at all. Meanwhile, the sensor itself will be protected by being housed within the confines of the production machinery. All these factors make the chance of interference to the sensor's operations remote.

Thus, application of spectrum etiquette rules to sensors is not needed to prevent them from causing or receiving harmful interference.

C. Commission Action Will Be Needed If Industry Efforts Do Not Produce an Acceptable Spectrum Etiquette Proposal

As noted above, Cutler-Hammer intends to actively participate in the ongoing industry negotiations to develop spectrum etiquette standards that are consistent with a range of applications in the 59-64 GHz band. Based on our initial conversations with other members of the group studying this issue, we believe that the group will be responsive to our concern that any spectrum etiquette rules not limit our ability to use this spectrum for advanced sensor equipment. As a result, we are hopeful that the negotiations will yield a timely proposal that we can fully support.

Obviously, however, there is no guarantee of such an outcome. On one hand, it is possible that the industry coalition will be unable to reach any agreement on a spectrum etiquette proposal for submission to the Commission within the one-year deadline set out in the *Notice*. If that occurs, Cutler-Hammer urges the Commission to implement the rules for 59-64 GHz operations immediately without any spectrum etiquette standards. The Commission indicated in the *Notice* that it would do exactly that, to ensure that use of the band is not unduly delayed. *Notice* at ¶ 64.

On the other hand, it is possible that the industry negotiations will produce a proposal that creates a barrier to certain applications in the 59-64 GHz band. Such a proposal would directly conflict with the Commission's stated desire not to restrict the development of new technology in this band. *See id.* As a result, we urge the Commission to reject or modify any proposal that unnecessarily limits the uses that can be made of the band. The Commission's decision to allocate this spectrum on a general unlicensed basis contemplates that market forces will determine what services are made available. The Commission must not permit the spectrum etiquette process to operate as a barrier to entry. Instead, any spectrum etiquette rules that are adopted should be consistent with the policy of encouraging the introduction of a broad range of applications.

Finally, Cutler-Hammer emphasizes that it will be critical for the Commission to act quickly, however the spectrum etiquette negotiations turn out. Until the Commission lifts the suspension, no operations in this band can begin.

Accordingly, the Commission should proceed immediately to resolve the spectrum etiquette issue as soon as the one-year deadline for industry discussions has passed.

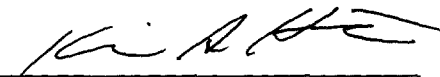
CONCLUSION

Cutler-Hammer is optimistic that industry negotiations will result in a spectrum etiquette proposal that permits introduction of a wide range of services in the 59-64 GHz band. If that does not happen, however, it will be up to the Commission to ensure that any rules adopted are consistent with all prospective uses of the band and that implementation of the band is not unduly delayed.

Respectfully submitted,

CUTLER-HAMMER, INC.

Tim Christensen
Principal Sensor Development Engineer
Cutler-Hammer, Inc.
4201 North 27th Street
Milwaukee, WI 53216
(414) 449-6335

By: 
Peter A. Rohrbach
Karis A. Hastings
Hogan & Hartson L.L.P.
555 Thirteenth St., N.W.
Washington, D.C. 20004
(202) 637-5600

Its Attorneys

May 28, 1996

CERTIFICATE OF SERVICE

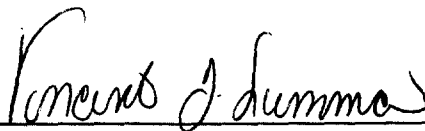
I hereby certify that copies of the foregoing Comments of
Cutler-Hammer, Inc. were served by hand delivery this 28th day of May, 1996 to:

Richard M. Smith, Chief
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, N.W., 4th Floor
Washington DC 20554

Michael J. Marcus
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, N.W., 4th Floor
Washington DC 20554

Richard B. Engelman
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, N.W., 4th Floor
Washington DC 20554

John A. Reed
Office of Engineering and Technology
Federal Communications Commission
2000 M Street, N.W., 4th Floor
Washington DC 20554



Vincent J. Summa